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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/852,616	05/11/2001	Thomas G. Lang		5341

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08/16/2002

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EXAMINER

VASUDEVA, AJAY

ART UNIT

PAPER NUMBER

3617

DATE MAILED: 08/16/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	09/852,616		LANG ET AL.	
	Examiner		Art Unit	
	Ajay Vasudeva		3617	

-- **Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --**
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____ .
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-220 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 74-78 is/are allowed.
- 6) ☐ Claim(s) See Continuation Sheet is/are rejected.
- 7) ☐ Claim(s) 11, 12, 41, 51, 88, 89, 91, 92, 98, 115, 156, 163, 164, 178, 183-188 and 198-201 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Disposition of Claims: Claims rejected are 1-10,13-40,42-50,52-73,79-87,90,93-97,99-114,116-155,157-162,165-177, 179-182,189-197 and 202-220.

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DETAILED ACTION

Election/Restriction

1. In response to examiner's election of species requirement dated 4/12/2001, applicant made an election with traverse of claims of Group 1 in Paper No. 4. The examiner found applicant's arguments persuasive, and therefore has reinstated all claims in the application.

Specification

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o).

It is noted that the claims are replete with subject matter that has not been described in the specification. Applicant must ensure that all claimed subject matter finds proper antecedent in the specification.

The following are some of the examples of such claimed subject matter:

- An automatic motion control system for controlling vessel roll and pitch (claim 6).
- An automatic motion control system for controlling vessel height (claim 10).
- A permeable wall (claim 11).
- The fence comprising a fluid jet (claim 19).

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- Plural jets for supplying gas to each adjacent cavity (claim 21).
- Changing size of cavity by controlling geometry of hydrofoil cross section.(claim 23).
- Water separator connected to a gas remover for separating water from the removed gas, and a recycler for recycling the removed gas (claim 28).
- Surfaces ahead of the trailing edge being concave (claim 30).
- An automatic control system for controlling the nose flap (claim 33).
- The trailing edge section being replaceable (claims 36 and 70).
- Retractors for retracting the hydrofoil (claim 38).
- Take off mode controller for supplying additional gas to the lower cavity (claim 39).
- The local angle of attack of the hydrofoil reduces toward each tip (claim 44).
- The hydrofoil resembles delta foil (claim 46).
- A generator, and air used for generating power in the generator (claim 49).
- Additional hydrofoil mounted above the main hydrofoil (claim 51).
- The tip portion of the hydrofoil having a closed cavity (claims 59, 172, and 208).
- The leading edge section being replaceable (claim 60 and 69).
- The gas flow restrictor communicating with gas flow releaser for ensuring that each cavity closes ahead of the trailing edge (claim 62).
- An adjustable trailing edge flap for controlling side force (claim 81).
- Each nose flap individually being pivotable (claim 83).
- A debris cutter (claim 88).

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- One additional discontinuity on each side (claim 92).
- A propulsion drive shaft located within a strut (claim 105).
- Counter rotating drive shafts (claim 106).
- Anti-swirl vanes (claim 107).
- Provision of bearings and gearing for the drive shaft, and ducting of gas along the drive shaft (claim 115).
- Lower gearbox contained within a pod (claim 116).
- A gas flow limiter for closing cavity ahead of a trailing edge without gas being artificially withdrawn (claims 125 and 143).
- Controlling the gas flow rate with a pressure and size of the openings (claim 190).

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the following must be shown or the feature(s) canceled from the claim(s).

- An automatic motion control system for controlling vessel roll and pitch (claim 6).
- An automatic motion control system for controlling vessel height (claim 10).
- The fence comprising a fluid jet (claim 19).
- Plural jets for supplying gas to each adjacent cavity (claim 21).

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- Water separator for separating water from the removed gas, and a recycler for recycling the removed gas (claim 28).
- Surfaces ahead of the trailing edge being concave (claim 30).
- An automatic control system for controlling the nose flap (claim 33).
- Retractors for retracting the hydrofoil (claim 38).
- Take off mode controller for supplying additional gas to the lower cavity (claim 39).
- The hydrofoil resembles delta foil (claim 46).
- A generator (claim 49).
- Additional hydrofoil mounted above the main hydrofoil (claim 51).
- The tip portion of the hydrofoil having a closed cavity (claims 59, 172, and 208).
- The gas flow restrictor communicating with gas flow releaser (claim 62).
- An adjustable trailing edge flap for controlling side force (claim 81).
- A debris cutter (claim 88).
- One additional discontinuity on each side (claim 92).
- A propulsion drive shaft located within a strut (claim 105).
- Counter rotating drive shafts (claim 106).
- Provision of bearings and gearing for the drive shaft, and ducting of gas along the drive shaft (claim 115).
- Lower gearbox contained within a pod (claim 116).

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- A gas flow limiter for closing cavity ahead of a trailing edge without gas being artificially withdrawn (claims 125 and 143).

No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 6, 10, 23, 28, 33, 39, 49, 52-55, 59, 62-73, 81-84, 125-144, 172, and 208 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In the claims, applicant has claimed some subject matter, as follows, for which sufficient description is lacking as to how the following mechanism/arrangement is disposed, or how does it operate to achieve the claimed features.

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Specifically, the applicant claims:

- i. An automatic motion control system for controlling vessel roll and pitch (claim 6).
- ii. An automatic motion control system for controlling vessel height (claim 10).
- iii. The fence comprising a fluid jet (claim 19).
- iv. Changing size of cavity by controlling geometry of hydrofoil cross section.(claim 23).
- v. A water separator for separating water from the removed gas, and a recycler for recycling the removed gas (claim 28).
- vi. An automatic control system for controlling the nose flap (claim 33).
- vii. Take off mode controller for supplying additional gas to the lower cavity (claim 39).
- viii. Use of air for generating power in the generator (claim 49).
- ix. The tip portion of the hydrofoil having a closed cavity (claims 59, 172, and 208).
- x. The gas flow restrictor communicating with gas flow releaser for ensuring that each cavity closes ahead of the trailing edge (claim 62).
- xi. An adjustable trailing edge flap for controlling side force (claim 81).
- xii. Each nose flap individually being pivotable (claim 83).
- xiii. A gas flow limiter for closing cavity ahead of a trailing edge without gas being artificially withdrawn (claims 125 and 143).
- xiv. Controlling the gas flow rate with a pressure and size of the openings (claim 190).

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However, the specification or the drawings fail to describe as to how any of the above mechanism/arrangement is disposed, or how does it operate to achieve the claimed features in order to enable one skilled in the art to make and/or use the invention..

Note: Applicant is cautioned against introducing any new matter in the application.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 44, 96, 145-151 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 44, use of a “local angle of attack” (emphasis added) is indefinite. It is not clear what such “local” angle is, and if such angle is different from the commonly-known “angle of attack” defined by the geometry of the hydrofoil.

Regarding claims 52, 54, 55, 145, 146, 149, 150, and 151, the phrase "saw-tooth-like" renders the claims indefinite because the claims include elements not actually disclosed (those

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encompassed by "-like"), thereby rendering the scope of the claims unascertainable. See MPEP § 2173.05(d).

In claim 96, use of a "the body has a yaw angle" (emphasis added) is vague and indefinite. It is not clear what is being claimed.

In claim 150, use of a "sides deviating from side lines" is indefinite. From the language used in the claim, it is not clear whether the sides are being claimed as being non-parallel, or if they are being claimed as being slanted at a certain degree.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

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9. Claim 145 is rejected under 35 U.S.C. 102(b) as being anticipated by Wippel.

Wippel describes a moving underwater surface, generally as claimed, having a closed cavity, and a method of providing a series of saw-tooth shapes on the surface (figure 3) to reduce drag.

10. Claims 1-10, 13-18, 20-32, 34-38, 40, 42, 43, 45-48, 50, 60-73, 79, 80, 85-87, 90, 93-95, 97, 99-105-114, 116-137, 139-144, 152-155, 157-162, 165-169, 175-177, 179-182, 189-197, 202, 203, 214-220 are rejected under 35 U.S.C. 102(e) as being anticipated by Lang (US 6167829 B1).

Lang ('829) describes a watercraft, generally as claimed, having a strut (figure 10) for attaching a hydrofoil [3] (figure 1) to a hull of the watercraft. The hydrofoil comprises spanwise discontinuities on each surface for forming closed cavities [1] (figure 19A) in a rearward direction that close ahead of the trailing edge of the hydrofoil. A gas source [137] fills the cavities with gas, and a gas flow restrictor limits release of gas into the cavities (column 13, lines 48-50, and column 38). A trailing flap is positioned at the trailing edge of the hydrofoil (figure 21A). Fore-and-aft fences are provided on the hydrofoils (column 7; and column 13, lines 63-65). Automatic controls are provided for controlling a nose piece and the tail piece (column 15, line 35). Gas is supplied via gas ducts inside the hydrofoil (figure 19A). A gas remover [153] is mounted near the trailing

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edge, with a recycler provided for recycling the removed gas (column 8, lines 40-45). The hydrofoils are retractable rearward and upward (column 2, lines 65-67). Vertically-extending discontinuities are provided on the struts to form open cavities on each side of the struts (column 7). The struts taper in the downward direction (column 19, line 33). Propulsion drive shaft that are counter rotating (column 29, line 32) are connected to the propulsion system and located within the strut (figures 28 and 29). The propellers can be superventilating or supercavitating (column 29, lines 32-35). A bow lifting strut [45] is positioned near the front of the watercraft for stabilizing it in heave and pitch.

Regarding the method claims 143, 144, 152-155, 157-162, 165-169, applicant may note that such methods in fact set forth all features of the hydrofoil elements described above, and are therefore inherent in process of assembling the hydrofoil as designed.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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12. Claims 52, 54, 55, and 145-151 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lang in view of Marentic et al.

Lang describes a watercraft with a hydrofoil having upper and lower surfaces exposed to gas flow in a closed cavity.

Lang is silent on the provision of saw-tooth shapes on the surfaces.

Marentic et al. describes providing a surface with riblets having saw-tooth shape in a cross section for reducing drag in an aerodynamic or hydrodynamic environment.

It would have been obvious for one skilled in the art at the time of the invention to provide the entire surfaces of the hydrofoil of Lang with the riblets having saw-tooth shape in a cross section, as taught by Marentic et al. Having such riblets would be advantageous as it would further reduce drag in the hydrofoil by disrupting turbulent vortices, thereby improving the operational efficiency of the watercraft.

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13. Claims 56-58, 170, 171, 173, 174, 204-207, and 209-213 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lang in view of Barkley.

Lang describes a watercraft with a hydrofoil.

Lang is silent on the provision of upward angled tip portion on each end of the hydrofoil.

Barkley describes provision of upward turned tip sections on the hydrofoils..

It would have been obvious for one skilled in the art at the time of the invention to provide the upwardly turned tip sections in the hydrofoil of Lang, as taught by Barkley. Having such tip sections would be advantageous as the inclined portion would provide stabilizing force to the watercraft when it tilts or rolls, thereby enabling the watercraft to maintain an even keel.

Allowable Subject Matter

14. Claims 74-78 are allowed.

15. Claims 11, 12, 41, 51, 88, 89, 91, 92, 98, 115, 156, 163, 164, 178, 183-188, 198-201 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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16. Claims 82, 84, and 138 would be allowable if the applicant overcome the rejection(s) under 35 U.S.C. 112, first paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

17. Claims 53, 147, and 148 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

McClure, Savill, Walsh et al., and von Schertel ('751 and '546) describe structures/features adaptable to be used with hydrofoils.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ajay Vasudeva whose telephone number is (703) 306-5992.

AV

August 11, 2002


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